

09/857133

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE
(DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER		
CASM117536		
U.S. APPLICATION NO. (if known see 37 C.F.R. 1.5)		
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/AU00/00810	5 July 2000	7 July 1999
TITLE OF INVENTION		
SECURITY DOCUMENT WITH RAISED INTAGLIO PRINTED IMAGE		
APPLICANT(S) FOR DO/EO/US		
Joshua Robert NEMETH		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information by **Express Mail**:

- ☒ 1. This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
- ☐ 2. This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 37 U.S.C. 371.
- ☒ 3. This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
- ☒ 4. The U.S. has been elected by the expiration of 19 months from the priority date (PCT Article 31).
- ☒ 5. A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - ☐ a. is attached hereto (required only if not communicated by the International Bureau).
 - ☒ b. has been communicated by the International Bureau.
 - ☐ c. is not required, as the application was filed in the United States Receiving Office (RO/US).

LAW OFFICES OF
CHRISTENSEN O'CONNOR
JOHNSON & KINDNESS^{PLLC}
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(206) 682-8100

- Items 11. to 20. below concern document(s) or information included:**

- LAW OFFICES OF
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<u>X</u> 21. The following fees are submitted:				CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1,000 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$710 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)..... \$690 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$1,000	
Surcharge of \$130 for furnishing the oath or declaration later than ____ 20 30 months from the earliest claimed priority date (37 CFR 1.492(e))				\$--	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	14 - 20 =	0	X \$18	\$--	
Independent claims	2 - 3 =	0	X \$80	\$--	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ \$270	\$270	
TOTAL OF ABOVE CALCULATIONS =				\$1,270	
____ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$--	
SUBTOTAL =				\$1,270	
Processing fee of \$130 for furnishing the English translation later than ____ 20 ____ 30 months from the earliest claimed priority date (37 CFR 1.492(f)) +				\$--	
TOTAL NATIONAL FEE =				\$1,270	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) \$40 per property +				\$--	
TOTAL FEES ENCLOSED =				\$1,270	
				Amount to be:	\$
				refunded	
				charged	\$

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- X a. A check in the amount of \$ 1,270 to cover the above fees is enclosed. Check No. 128854.
- b. Please charge my Deposit Account No. in the amount of \$ to cover the above fees. A duplicate copy of this sheet is enclosed.
- X c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-1740. A duplicate copy of this sheet is enclosed.

SEND ALL CORRESPONDENCE TO:

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Respectfully submitted,

CHRISTENSEN O'CONNOR
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EXPRESS MAIL CERTIFICATE

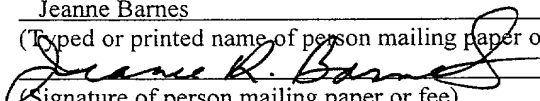
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Date of Deposit May 31, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Jeanne Barnes

(Typed or printed name of person mailing paper or fee)


(Signature of person mailing paper or fee)

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JD18 Rec'd PCT/PTO 31 MAY 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Joshua Robert NEMETH Attorney Docket No. CASM117536

Int'l Application No: PCT/AU00/00810 Int'l Filing Date: 5 July 2000

U.S. Application Serial No:-- Priority Date Claimed: 7 July 1999

Filed: Concurrently Herewith Examiner:--

Title: SECURITY DOCUMENT WITH RAISED INTAGLIO PRINTED IMAGE

PRELIMINARY AMENDMENT

TO THE COMMISSIONER FOR PATENTS:

Please enter the following Preliminary Amendment for the above-identified patent application, which is the contemporaneously filed United States national application corresponding to International application No. PCT/AU00/00810, as follows:

In the Specification:

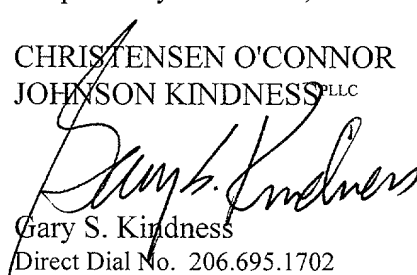
Amend the specification by inserting the following after the title: --This is a United States national stage application of International application No. PCT/AU00/00810, filed July 5, 2000, the benefit of the filing date of which is hereby claimed under 35 U.S.C. § 120, which in turn claims the benefit of Australian application No. PQ 1461, filed July 7, 1999, the benefit of the filing date of which is hereby claimed under 35 U.S.C. § 119.--.

REMARKS

If there are any questions, the Examiner is invited to telephone applicant's attorney at the number listed below.

Respectfully submitted,

CHRISTENSEN O'CONNOR
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GSK/PAS:lsj

SECURITY DOCUMENT WITH RAISED INTAGLIO PRINTED IMAGE**Field of the Invention**

This invention relates to security documents such as passport, bonds, banknotes, and security devices such as security passes and the like.

5 Background Of The Invention

Optically variable devices embedded in security documents are used to provide a high level of security whilst also providing an aesthetically pleasing effect.

Printed matter always has the problem of being copied or simulated by photocopying or scanning devices as well as simple printing techniques widely available in the commercial world. Therefore, devices that change colour or shape under various lighting conditions and or geometry make the task of counterfeiting or simulating the document much more difficult.

The introduction of the polymer security substrate has offered the perfect medium to produce secure devices in a cost effective and secure manner. As most high level security documents are already printed via the intaglio process, a well known method of printing which uses elevated temperatures and high pressures, 70° - 90°C at 25 - 30 Mpa, the machines and special inks for this process are only sold to bona fide security printers, which offers a degree of inherent security.

In International Patent Application PCT/AU98/00046, a printed security document or device is described as including a reflective or brightly coloured base layer and a raised printed image applied to that layer by a printing process, at least part of the raised printed image having a height of at least 5µm, the image being enhanced by the reflective or brightly coloured layer when viewed at different angles under different lighting conditions. Subsequent research on the effect created by this arrangement has revealed that it is important for best results for the base layer to be highly reflective and for the raised printed image to be printed in an ink having predetermined chroma and lightness.

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It has now been determined that different effects can be achieved, while maintaining the same or better security, by changing the nature of the ink for producing the raised printed image.

Summary of the Invention

5 The invention provides a security document or other device including a substrate, a smooth highly reflective layer applied to said substrate and having a reflectivity of at least 60 gloss units, and a raised printed image applied to said reflective layer by a printing process, at least part of said raised printed image having a height of at least 10 μm , said printed image being printed using ink
10 having properties which render it substantially transparent or translucent while causing scattering of the light reflectance and transmittance in at least a partially specular manner.

By printing an image using substantially transparent or translucent ink on the reflective layer or patch, a slightly specular scattering of the light is caused
15 by the translucent intaglio ink when the document is viewed within the window of high reflection, which, is of a high contrast to the relatively coherent reflections from the substrate. This contrast causes the image produced by the printed translucent intaglio ink to be very visible.

In a preferred form of the invention, the translucent ink has a haze value
20 range of about 60 to 98, and more preferably about 85 to 95 as measured on an electro-optical haze measuring instrument, such as the XL 211Hazegard™ system manufactured by Gardener Laboratories Inc of Bethesda, Maryland, USA at an ink thickness of 15 microns. The appearance of such a 15 micron sample is similar to have copy paper or tracing paper in which light of the entire
25 visible spectrum is able to transmit through the sample but the degree of light scatter is considerable. If the ink is touching an object such as by being printed on it, the underlying object is clearly distinguishable, but if the underlying object is more than about one centimetre away from the object, it is no longer distinguishable.

30 When the document is viewed from outside the window of high reflection, the substrate below the translucent intaglio ink has a dull appearance.

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This dull appearance does not have a contrasting effect to the slightly specular reflectance and transmittance caused by the translucent ink. As a result, the image of the translucent ink is essentially invisible.

The invention also provides a method of producing a security document or other device, including the steps of applying a smooth highly reflective layer to a substrate, said reflective layer having a reflectivity of at least 60 gloss units, and printing a raised printed image on the reflective layer, at least part of said raised printed having a height of at least 10 μm and being printed using ink having properties which render it substantially transparent or translucent while causing scattering of the light reflectance and transmittance in at least a partially specular manner.

The smooth highly reflective layer can be applied by printing as part of the gravure printing process used to print security documents and devices, such as banknotes. If desired, other printing processes, such as silk screen printing, may be used to apply the layer. Alternatively, a layer having the required reflectivity can be achieved by hot stamping of foil having the required reflectivity to the substrate.

Where the smooth highly reflective layer is applied by a printing process, it is applied in a manner which achieves a layer thickness of about 3 μm .

The layer can be restricted to a relatively small region or patch of the substrate defining the security document or other device to thereby define a specific security feature in the document or device. Alternatively, the layer can be applied to larger areas of the substrate, including the whole substrate.

The substrate is preferably a smooth substrate such as a laminated polymer material of the type used in the production of Australian banknotes, and manufactured and sold by the applicant under the trade mark GUARDIAN, or any other smooth surfaced polymer suitable for use in the production of security documents or devices. Although paper substrates are not as smooth as polymer substrates, acceptable results can be achieved by printing or laminating a reflective patch onto a paper substrate, which is then calendared by the subsequent intaglio printing process.

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Where the smooth highly reflective layer is applied by printing, the ink used should incorporate selected pigments and binders which will enable the cured reflective surface to withstand chemical and physical attack over an extended period of time, comparable to the expected life of the document.

5 The printed image is preferably applied by intaglio printing, or although other known printing processes capable of producing raised lines or dots on the reflective layer may be used. Intaglio printing can produce superior tonal effects by altering line widths and/or dot dimensions as in the other printing process, as well as by altering the height of the print.

10 The height component of the intaglio printing can be used well for this feature to enhance the partial specular reflection and transmittance of light caused by the translucent ink, thus enhancing the contrasting image viewed in the window of high reflection. The printed image will typically have an average height of about 10 μm to 100 μm , which is about the upper limit of the height which can
15 be achieved using the intaglio printing process.

The intaglio ink used for printing the image should be substantially transparent or translucent such that it is able to scatter the light reflectance and transmittance in at least a partially specular manner.

20 An interesting and marketable variation on this invention is created if the reflective substrate bears non-reflective indicia. Using this arrangement, the contrast caused by the slightly specular reflection and transmittance when the document is viewed in the window of high reflection, causes the indicia to blur and become unrecognisable.

Therefore:

25 when the document is viewed in the window of high reflection the image produced by the translucent intaglio ink is the visible image;

when the document is viewed outside the angle of high reflection the image produced by the non-reflective indicia on the reflective substrate is the visible image.

For the translucent ink to optimally blur the non-reflective indicia, the pitch of the intaglio lines or dots should be roughly twice that of the indicia, as illustrated in Figure 3.

Brief Description Of The Drawings

5 A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

Figures 1 is a schematic illustration of a document embodying the invention,

10 Figure 2 illustrates the optical properties of the reflective layer absent the printed image, and

Figure 3 illustrates a document to which the invention has been applied in which the repeated word TIDE is shown in hidden by dots (a) and (b) and lines (c).

Description Of The Preferred Embodiments

15 As illustrated in Figure 1, reflective metallic ink patches 1 are printed by the gravure printing process onto a smooth polymer substrate 2, such as any one of the substrates currently used in the production of polymer banknotes in Australia and overseas, for example "Guardian" substrate, and a printed image 3 is applied to the patches 1 by intaglio printing. The following preferred ink
20 formulations and gravure engraving specifications will produce acceptable results in the reflective patches 1.

To achieve the required highly reflective surface, the following inter formulations and gravure engraving specifications can be used:

Silver colored reflective patch.

25 Eckart Aluminium (PCA)-18% Syloid 308-0.5-1.0%
Resin (two pack polyurethane system)-35% Catalyst-5.3%
MIBK-3%

Add Ethyl Acetate to achieve a printing viscosity of 21-23secs. using Zahn cup No. 2

30 Gold coloured reflective patch.

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Eckart Gold (Rotoflex, Resist Grade Rich Pale Gold)-31%
 Resin (two pack polyurethane system)-29% MIBK-3%
 Syloid 308-0.5-1.0% Catalyst-4.4%

Add Ethyl Acetate to achieve a printing viscosity of 21-23secs. using Zahn cup

5 No. 2

The gravure cylinder configuration used for these formulations is:

Wall = 10 μm Width = 200.1838 μm

Channel = 36 μm Cell Depth = 57.78807 μm

Lines/cm = 59 μm Stylus = 120°

10 Screen = 41.2 μm

To measure the specular reflectance, in percent (R_s), of these metallic surfaces, the following equation can be used:

R_s (percent) =

$$50 \left[\left[\frac{\cos i - \sqrt{n^2 - \sin^2 i}}{\cos i + \sqrt{n^2 - \sin^2 i}} \right]^2 + \left[\frac{n^2 \cos i - \sqrt{n^2 - \sin^2 i}}{n^2 \cos i + \sqrt{n^2 - \sin^2 i}} \right]^2 \right]$$

where:

i = the specular (incidence) angle, and
 n = the index of refraction of the surface.

15 This formula can be found in ASTM Standard D 2457 – 97, Standard Test Method for Specular Gloss of Plastic Films and Solid Plastics

A suitable instrument for reasoning specular reflectance is the Micro-Tri-Gloss Meter which uses the above methodology to measure gloss units. The results are related to a highly polished black surface with a refractive index of
 20 1.567.

Below are typical measurements for different substrates measured at a 45° angle:

	Matt white paper –	= 5.4
	Opacified “Guardian” substrate	= 10.1
25	Metallic Silver ink (on paper)	= 20.4
	Silver on Opacified “Guardian substrate™”	= 102.3

Note: At a 45° angle, a perfect mirror measures 1000.

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With Matt white paper, the light is reflected in the direction of specular reflection as well as other directions. The capacity of a surface to reflect a light source is therefore significantly reduced. With opacified substrate, the surface is flatter and smoother, however the light source is still reflected specularly. The metallic ink on paper is better but the rougher surface of the paper still affects the reflective properties of the ink. On the other hand, the metallic ink on opacified "Guardian" substrate is more reflective. The intensity of the reflected light is dependent on the angle of illumination and material properties.

The printed image 3 is applied to the reflective patches 1 by means of the intaglio printing process using an ink having transparent or translucent properties, as explained above.

The transparent intaglio ink has the following different properties to other standard intaglio inks:

Higher resin content (about 40 - 55 % wt)

No pigments for clear translucent

Reduced pigments for coloured translucent(<2 % wt)

No opacifying agents

Use of transparent filler (such as commercially available "Transpafill" and "Aerosils"), with a high loading (about 20 - 30% wt).

The ink has similar loadings of solvents, driers and waxes as other standard intaglio inks.

The intaglio printing is applied to the patches 1 to form indicia or other desired images 3.

A plain reflective patch 1 without a printed image experiences two modes of viewing in the presence of a singular light source. When the viewing angle of the document is equal to the angle of incidence of the light point source, the reflective patch 1 appears highly reflective, with minimal light scatter. If the viewing angle is outside the angle of incidence β of the light source (with a buffer of about 15°), the patch 1 appears relatively dull. The viewing angles of high reflection α are referred to as the window of high reflection, as illustrated in Figure 2.

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By printing an image 3 of dots (Figs 3(a) and (b)) on lines (Fig 3(c)), using substantially transparent or translucent ink on the reflective layer or patch 1, a slightly specular scattering of the light is caused by the translucent intaglio ink when the document is viewed within the window of high reflection, which, is of a high contrast to the relatively coherent reflections from the substrate. This contrast causes the image produced by the printed translucent intaglio ink to be very visible. It will be noted from Fig. 3 that the pitch of the intaglio dots and lines is about half the pitch of the underlying indicia.

When the document is viewed from outside the window of high reflection, the substrate below the translucent intaglio ink has a dull appearance. This dull appearance does not have a contrasting effect to the slightly specular reflectance and transmittance caused by the translucent ink. As a result, the image of the translucent ink is essentially invisible. In this way the described management provides a useful security feature which does not require special equipment or expertise for use.

CLAIMS:

1. A security document or other device including a substrate, a smooth highly reflective layer applied to said substrate and having a reflectivity of at least 60 gloss units, and a raised printed image applied to said reflective layer by a printing process, at least part of said raised printed image having a height of at least 10 microns, said printed image being printed using ink having properties which render it substantially transparent or translucent while causing scattering of the light reflectance and transmittance in at least a partially specular manner.

2. The security document of claim 1, wherein the translucent ink has a haze value in the range of about 60 to 98, as measured on an XL 211 Hazegard haze measuring instrument and an ink thickness of about 15 microns.

3. The security document of claim 2, wherein the haze value is about 85 to 95.

4. The security document or device of claim 1, 2 or 3, wherein the smooth highly reflective layer is applied to said substrate by a printing process.

5. The security document or device of any preceding claim 4, wherein the printing process is the same printing process used to print the remainder of security document or device.

6. The security document or device of any preceding claims, wherein the printing process is a gravure printing process.

7. The security document or device of any preceding claim, wherein the reflective layer is about 3 microns thick.

8. The security document or device of any one of claims 1 to 7, wherein the smooth highly reflective layer compresses a reflective foil applied to the substrate.

9. The security document or device of any preceding claim, wherein the substrate is a smooth surfaced polymer film of the type suitable for the production of banknotes.

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10. The security document or device of any preceding claim, wherein the properties of the ink produce an image having optical properties similar to the optical properties of tracing paper.

11. A method of producing a security document or other device,
5 including the steps of applying a smooth highly reflective layer to a substrate, said reflective layer having a reflectivity of at least 60 gloss units, and printing a raised printed image on the reflective layer, at least part of said raised printed having a height of at least 10 μm and being printed using ink having properties which render it substantially transparent or translucent while causing scattering
10 of the light reflectance and transmittance in at least a partially specular manner.

12. The method of claim 11 including steps which produce a document or device as claimed in any one of claims 2 to 10.

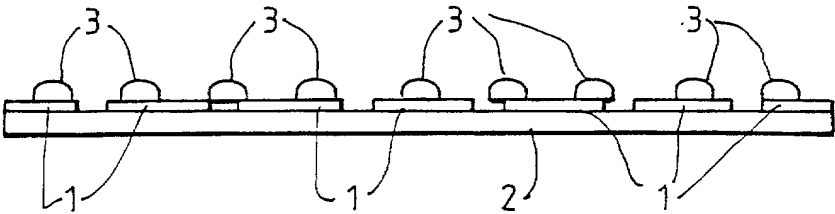


FIG. 1.

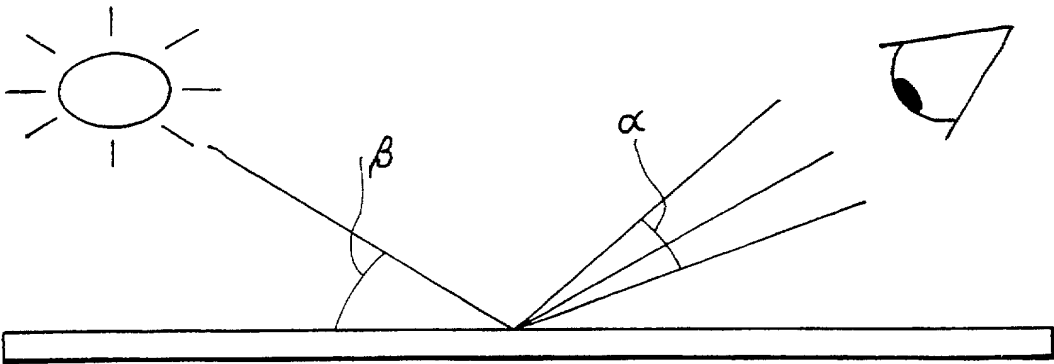
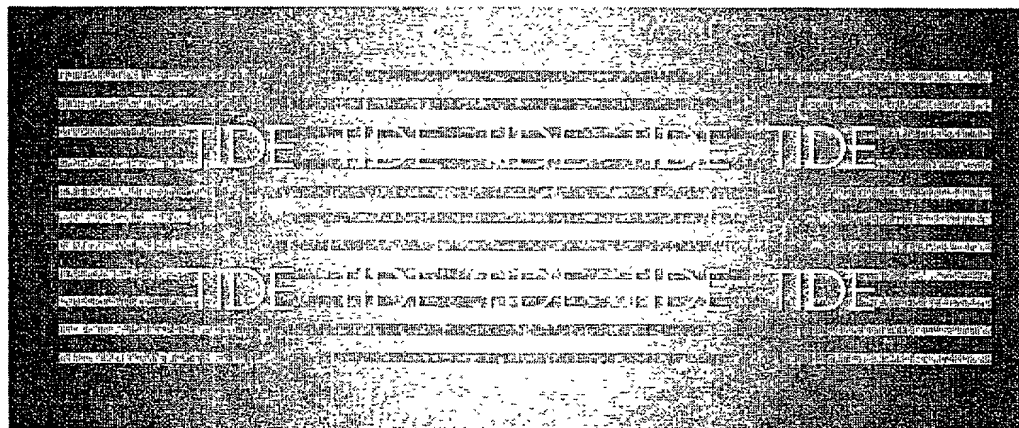
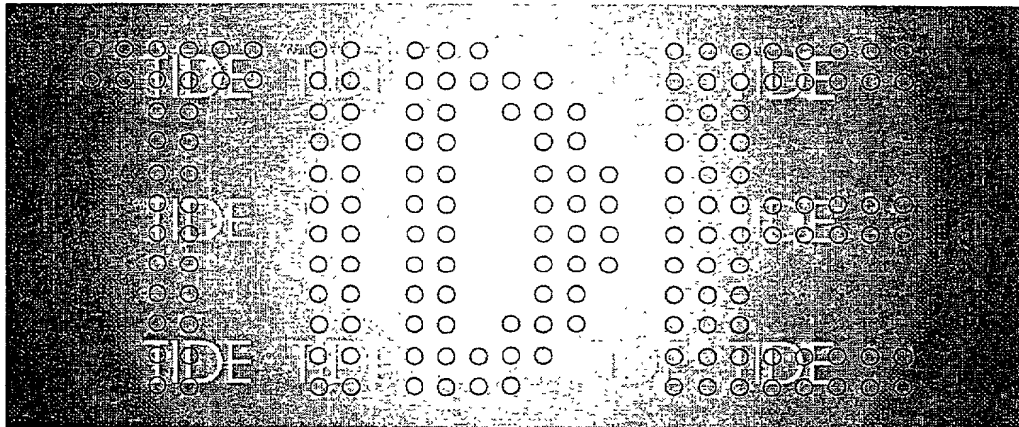
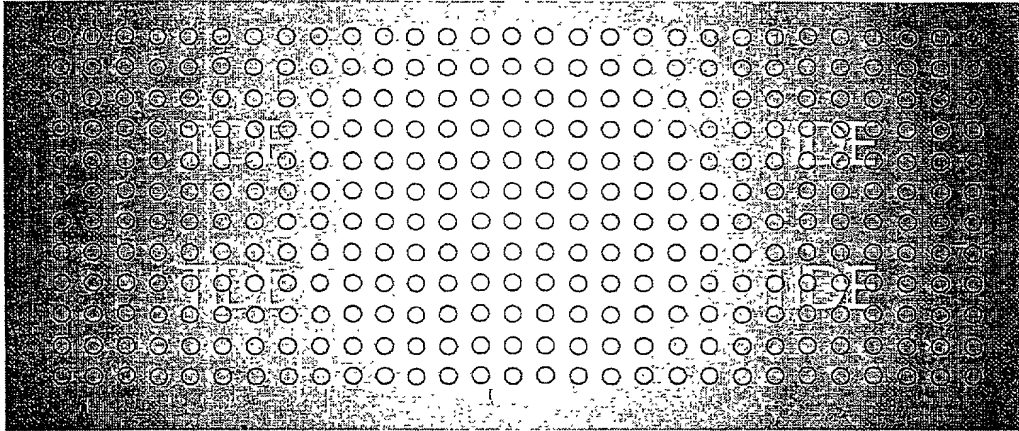


FIG. 2.



III.3.

2

**COMBINED DECLARATION AND POWER OF ATTORNEY
IN PATENT APPLICATION**

Attorney Docket No: CASM-1-17536

As a below-named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name;

I believe that I am the original, first and sole inventor of the subject matter that is claimed and for which patent is sought on the invention entitled: Security document with raised intaglio printed image the specification of which :

_____ was executed on _____ and filed concurrently herewith.

_____ we hereby authorize our attorneys of the firm of Christensen, O'Connor, Johnson & Kindness, 1420 Fifth Avenue, Suite 2800, Seattle, Washington 98101, to insert here in parentheses (was filed as United States application Serial No. _____, on _____) the application number and filing date of said application.

_____ was filed as United States application Serial No. _____ on _____.

XX was filed as PCT international application No. PCT/AU00/00810, on 5 July 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below, any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

<u>Number</u>	<u>Country</u>	<u>Day/Month/Year Filed</u>	<u>Priority Claimed Yes/No</u>
PQ1461	Australia	7 July 1999	Yes

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

<u>Serial No.</u>	<u>Filing Date</u>	<u>Status</u>
-------------------	--------------------	---------------

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith: Bruce E. O'Connor, Reg. No. 24,849; Lee E. Johnson, Reg. No. 22,946; Gary S. Kindness, Reg. No. 22,178; James W. Anable, Reg. No. 26,827; James R. Uhlir, Reg. No. 25,096; Jerald E. Nagae, Reg. No. 29,418; Dennis K. Shelton, Reg. No. 26,997; Jeffrey M. Sakoi, Reg. No. 32,059; Ward Brown, Reg. No. 28,400; Robert J. Carlson, Reg. No. 35,472; Marcia S. Kelbon, Reg. No. 34,358; ~~Paul L. Gardner, Reg. No. 23,372;~~ ~~Shankar A. Karjekar, Reg. No. 34,049;~~ Rodney C. Tullet, Reg. No. 34,034; ~~Chun M. Ng, Reg. No. 36,878;~~ and the firm of Christensen O'Connor Johnson & Kindness^{PLLC}. Address all telephone calls to Gary S. Kindness at telephone No. (206) 224-1702.

Address all correspondence to:

CHRISTENSEN, O'CONNOR, JOHNSON & KINDNESS
1420 Fifth Avenue, Suite 2800
Seattle, WA 98101-2347

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

<u>Joshua Robert NEMETH</u>	<u>Australian</u>
<u>Full Name of Inventor</u>	<u>Citizenship</u>
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<u>Post Office Address</u>	
<u><i>Joshua Nemeth</i></u>	<u>7-5-01</u>
<u>Inventor's Signature</u>	<u>Date</u>